



# **Mauna Kea Forest Restoration Project**

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## **Volunteer Packet**

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## Packing Checklist

### At minimum, bring:

- ☐ Sturdy boots (ankle supporting)
- ☐ Long pants
- ☐ T-shirts or long sleeved shirts for field work
- ☐ Rain jacket and rain pants
- ☐ Work gloves
- ☐ Sunscreen
- ☐ Sunglasses
- ☐ Water bottle
- ☐ Lunch
- ☐ Optional: hat, camera

### If staying overnight, also include:

- ☐ Warm Sleeping Bag (**rated 20° or below**)
- ☐ Sleeping Pad
- ☐ Warm Sweater
- ☐ Extra clothes
- ☐ Underwear
- ☐ Socks
- ☐ Personal toiletries (shampoo, washcloth, soap, toothbrush, toothpaste, etc.).
- ☐ Towel
- ☐ Warm sleep clothes, beanie
- ☐ Slippers
- ☐ Flashlight/headlamp
- ☐ Prescription medication
- ☐ Allergy medication, contact solution, glasses.
- ☐ Food for the trip (and cooler with ice)

SMOKING IS NOT ALLOWED ON MAUNA KEA.  
Fire destroys our precious dry forests.

ALL TRIPS TO MAUNA KEA ARE DRUG AND ALCOHOL FREE.

## Volunteer Safety Checklist

- **Fill out and sign your volunteer service forms.** Failure to do so will disqualify a person from access to MKFRP restoration areas and the State may not be responsible for the cost of emergency air evacuations, or workman's compensation.
- **Bring all required medication(s) with you.** If you have any medical conditions, please inform MKFRP staff before the work trip (*strictly confidential*).
- Volunteers with **asthma or allergies**—especially to bee stings—**must bring their medication(s)** and a MKRFP staff member must be advised prior to the trip. We are three hours away from any medical assistance.
- **At night the climate is freezing cold. Be prepared with heavy winter clothing.** Expect frost in the mornings.
- **Climate is hot and dry during the day;** expect dust, grass seeds, wind and limited shade. Latrine facilities in the field are limited. Be able to work in the hot sun all day. The work is hard but the company is good. **Weather can change quickly to cold wet weather. Be prepared.**
- **Drink water all day.** The high elevation and constant sun can dehydrate a person quickly.
- Know your limits, and advise your supervisor. **Disclose any physical limitations** to the project supervisor (*information kept confidential*).
- **Be aware of conditions around you.** If others are using heavy machinery or sharp equipment keep a safe distance between you and them.
- **All volunteers MUST have hiking boots that come above the ankle.** The terrain at the site is rocky and rugged, so good ankle support is essential.



## What to Expect

- **Fieldwork may become hazardous** in rainy or foggy conditions; for reasons of safety, a project postponement may be called with little advance notice.

- The cabin and work area are at a **high elevation** between 5,200-ft.–7,800-ft. Expect shortness of breath and fatigue.

• Our water source is from a catchment system and it **rains up there infrequently**. Showers are available but hopefully everyone can use as little water as possible so that we have that much more water available for our seedlings. Drinking water will be provided in large jugs.

- **Bring a warm sleeping bag (rated 20° or below)** and a head lamp. Because of the high-elevation, temperatures normally dip into the 20's. And it can be very dark at night.

- Our main cabin has a **fully equipped kitchen** including stove and

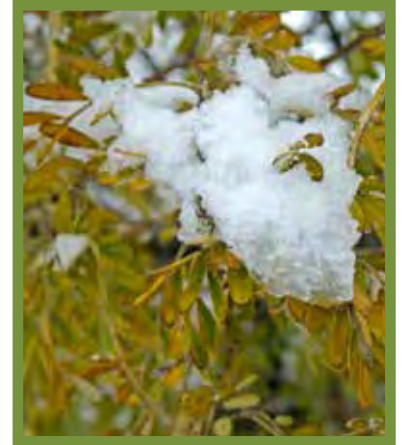
oven, pots and pans, and cooking and eating utensils. Bring a cooler with ice for your perrishable foods.

- At camp, we have **one composting toilet**. It is designed to handle all human waste and toilet paper, but nothing else. There are **no bathroom facilities in the field**.

- Our campsite at Pu'u Mali consists of **one main cabin** (kitchen, community area) and **14 one-to-two-person mini A-frame cabins for sleeping**. Tents are not necessary.

- Volunteers come from different backgrounds, yet everyone is there to help in the restoration of Mauna Kea. Come to work. **Teamwork is essential** for a successful work trip.

- Transport to and from the reserve and/or work may be delayed due to logistics coordination, safety or weather conditions. **Come with patience and a sense of humor.**



*Freezing temperatures are common at Pu'u Mali.*



*Individual "A-frame" sleeping cabins.*



## Native Flora

### **Māmāne** (*Sophora chrysophylla*)

One of the most common tree species in the high-elevation dry forest, māmāne is the primary food source for the Palila. The seed pods are toxic to most animals except the Palila and a *Cydia* caterpillar (a favorite of Palila chicks).

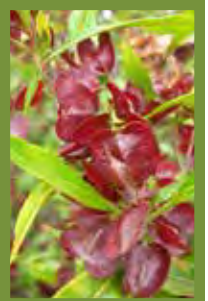


### **Naio** (*Myoporum sandwicense*)

A co-dominate tree species of the high-elevation dry forest, the naio is also found along the coast and many habitats in-between. Palila sometimes will eat naio leaves and fruit flesh and even nest in its shady branches.

### **‘A‘ali‘i** (*Dodonea viscosa*)

‘A‘ali‘i’s showy seed capsules are favorites of lei makers. In ancient times, the hard wood was crafted into sturdy tools. A prolific seed producer and quick grower, ‘a‘ali‘i is an essential species to restoration.



### **‘Iliahi** (*Santalum paniculatum*)

The fragrant flowers of the ‘iliahi were once a common scent wafting in the wind. Today, however, stands of ‘iliahi are very rare due in large part to the sandalwood harvest of the early 1800s that nearly wiped them out.

### **Pilo** (*Coprosma montana*)

A member of the coffee family, this pilo species is specific to the high elevation zones. It is characterized by its red-orange berries and small leaves.



### **‘Akoko** (*Chamaesyce olowaluana*)

This increasingly rare species is unique to the very dry habitats of Maui and Hawai‘i Island, most populous on Mauna Kea. These trees are unique among Hawai‘i flora because of their milky sap.



## Native Fauna



### Palila

(*Loxioides bailleui*)

This extremely rare bird is the last of the Hawaiian seed-eating finches. It feeds almost exclusively on māmane seed pods and flowers and is only found in the south-western high elevation dry forest of Mauna Kea.



### Hawai'i 'Amakihi

(*Hemignathus virens*)

The 'amakihi is the most common of all Hawaiian bird species. A nectar eater, the 'amakihi is easily seen and heard flitting from flower to flower, tree to tree. This species is also found in most native habitats throughout Hawai'i.



### 'Apapane

(*Himatione sanguinea*)

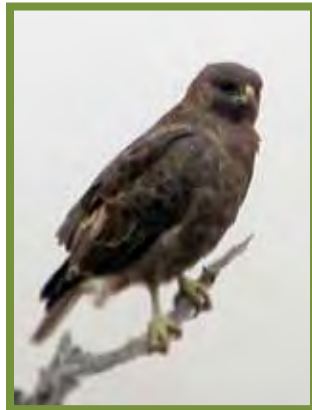
This scarlet red honey-creeper follows the flowering of māmane as it blooms from the wetter eastern slopes of Mauna Kea to the dryer māmane-dominated high western slopes.



### Hawai'i 'Elepaio

(*Chasiempis sandwichensis bryani*)

This native fly catcher can be seen flitting through the canopy and lower branches as it chases flying insects. The subspecies *bryani* is unique to Mauna Kea.



### 'Io

(*Buteo solitarius*)

The majestic Hawaiian hawk tends to soar above the forest searching for small birds, mice, and rats. While an endangered species, the 'io can readily be seen on Mauna Kea.



### Pueo

(*Asio flammeus sandwichensis*)

Hawai'i's only native owl, the pueo, is commonly seen soaring above the former pasture areas and open forests. The pueo is one of the few owls to forage during the day and rest at night.

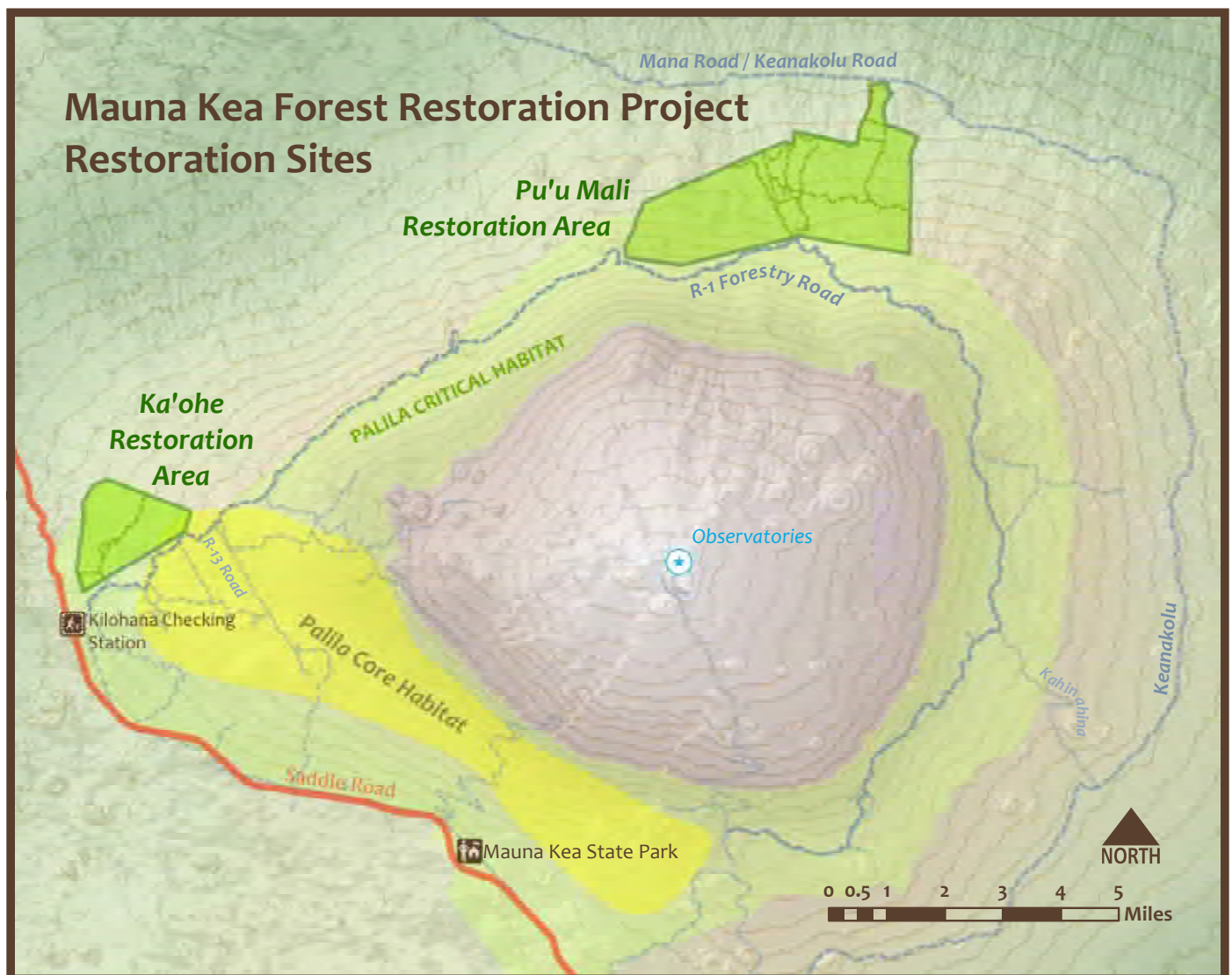


## Project Background

MKFRP was initiated as a result of the Saddle Road realignment project. The road was rerouted through lands designated as critical habitat for the federally endangered Palila (*Loxioides bailleui*). In 2002, two areas on Mauna Kea were designated for restoration of māmane (*Sophora chrysophylla*) forest to mitigate the habitat loss.

These areas are Pu'u Mali Restoration Area (PMRA; 5,140 acres) on the north slope and Ka'ohe Restoration Area (KRA; 1,400 acres) on the west slope. Both are State owned lands that were formerly leased for cattle ranching and are adjacent to existing māmane forest in the Mauna Kea Forest Reserve. Our goal is to extend the forest down to the lower elevations, increasing the year-round food availability for Palila. Fenced exclosures of each site were completed in 2006.

Since then MKFRP has been working to restore forest by removing feral ungulates, collecting seeds, propagating native seedlings, outplanting seedlings, controlling invasive plants, and removing predators from Palila Critical Habitat. The Hawai'i Division of Forestry and Wildlife (DOFAW) and the Pacific Cooperative Studies Unit (PCSU) cooperatively manage this project.



## Pu'u Mali Restoration Area (PMRA)

- **Location:** Northern slope of Mauna Kea. The area is adjacent to Mauna Kea Forest Reserve.
- **Driving time:** 2<sup>1/2</sup> hours from Hilo; 1 hour from Waimea.
- **Size:** 5,140 acres
- **Elevation range:** 5,200-ft. – 7,800-ft.
- **Fence:** 6-ft. woven-wire ungulate exclosure fence completed in 2006.
- **History:** Prior to cattle ranching, this site supported koa (*Acacia koa*) in the lower sections, with māmane (*Sophora chrysophylla*), naio (*Myoporum sandwicense*), and 'akoko (*Chamaesyce olowaluana*) in the upper areas. Native Hawaiians rarely visited these high elevation forests or the wao ākua (realm of the gods), although they may have passed though the forest on their way to adze quarries at higher elevations. With the arrival of Europeans, this area was degraded by centuries of cattle grazing. Livestock were completely removed in 2010..



*Pu'u Mali Restoration Area sits on the northern slope of Mauna Kea where volunteers help to restore previously ranched land back to native forest.*



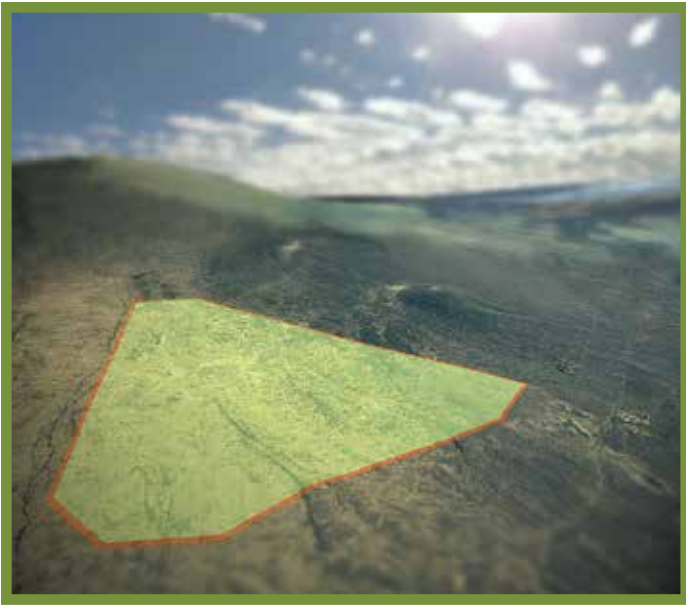
*The large 'a'ā flow that runs through the Pu'u Mali Restoration Area protects a diverse dry forest within 2,000 feet of elevation.*

in the pasture areas providing a reminder of the forest that we are restoring. Some native plants remain in the pasture in the gulches and rocky outcroppings which were inaccessible to ungulates. The 'a'ā flow protected native vegetation from cattle and supports a māmane-dominated forest with a substantial population of 'akoko. The 'a'ā flow also supports rich native plant diversity including na'ena'e (*Dubautia arborea*), ko'oko'olau (*Bidens menziesii*), small-leaved mā'ohi'ohi (*Stenogyne microphylla*), 'āweoweo (*Chenopodium oahuense*), 'ānunu (*Sicyos macrophyllus*), and Hawaiian stinging nettle (*Hesperocnide sandwicensis*)

- **Current management efforts:** A field camp serves as a base for staff, researchers, and volunteers. Current activities include: (1) site preparation prior to outplanting, (2) collecting native seeds, (3) outplanting seedlings, (4) scattering native seeds, (5) controlling cape ivy (*Delairea odorata*) and fountain grass (*Pennisetum setaceum*), (6) monitoring Palila, and (7) monitoring/maintaining the perimeter fence at Pu'u Mali Restoration Areas and the new Palila Critical Habitat fence.



## Ka'ohē Restoration Area (KRA)



*Ka'ohē Restoration Area lies on the western slope of Mauna Kea where palila still visit the remaining stands of māmane.*

- **Location:** Western slope of Mauna Kea adjacent to Ka'ohē Game Management Area, Parker Ranch, and downslope of Mauna Kea Forest Reserve.
- **Driving time:** 1<sup>1/2</sup> hours from Hilo; 1/2 hour from Waimea.
- **Size:** 1,400 acres
- **Elevation range:** 5,800-ft. – 7,000-ft.
- **Fence:** 4-ft. woven-wire ungulate exclosure fence completed in 2006.
- **History:** Historically, this site supported a rich dry forest of māmane (*Sophora chrysophylla*) and naio (*Myoporum sandwicense*). Native Hawaiians rarely visited high elevation forests or the wao

ākua (realm of the gods), although they may have passed through the forest on their way to adze quarries at higher elevations. With the arrival of Europeans, this area was degraded by centuries of cattle grazing. Aerial photos from 1950 indicate that a dense forest existed on site. However, much of the forest was converted to pasture and today the remaining forest is highly degraded. Livestock were completely removed in 2010. It is classified as Palila (*Loxioides bailleui*) Critical Habitat.

- **Current forest:** The upper and lower portions of the area support māmane and naio; much of the area in between the upper and lower portions is pasture. Cape ivy (*Delairea odorata*) is an invasive vine present throughout most of the forested area. The understory is dominated by non-native species including kikuyu grass (*Pennisetum clandestinum*) and fireweed (*Senecio madagascariensis*). 'Ulei (*Osteomeles anthyllidifolia*) and 'a'ali'i (*Dodonea viscosa*) occur in some areas. Māmane seedlings are sprouting throughout the unit now that ungulates have been removed.
- **Current management efforts:** (1) site preparation prior to outplanting, (2) collecting native seeds, (3) outplanting seedlings, (4) scattering native seeds, (5) controlling cape ivy and fountain grass, (6) monitoring Palila, and (7) monitoring/maintaining the perimeter fence at Pu'u Mali Restoration Areas and the new Palila Critical Habitat fence.



*Ka'ohē Restoration Area lies adjacent to Palila Critical Habitat and offers additional forest habitat.*





## Cultural Significance

Rising more than 2.5 miles above sea level, Mauna Kea defines the landscape of the island of Hawai‘i, and is the state’s highest mountain. For Hawaiians it is a *wahi pana*, a sacred place. Mauna Kea is considered by some to be the *kino lau* of Wākea—the physical form of Wākea, the forefather of the Hawaiian people.

In ancient times, Hawaiians rarely traveled to high elevation sites as these natural areas were respected as *wao ākua*, or the realm of the gods. And so, the high-elevation, dry land forest of Mauna Kea were especially revered. The few specialists that did travel through this unusual forest, thick with māmane and naio thickets and humming with Palila songs, were trekking to the summit area where rich dense basalt rock would be fashioned into adzes.

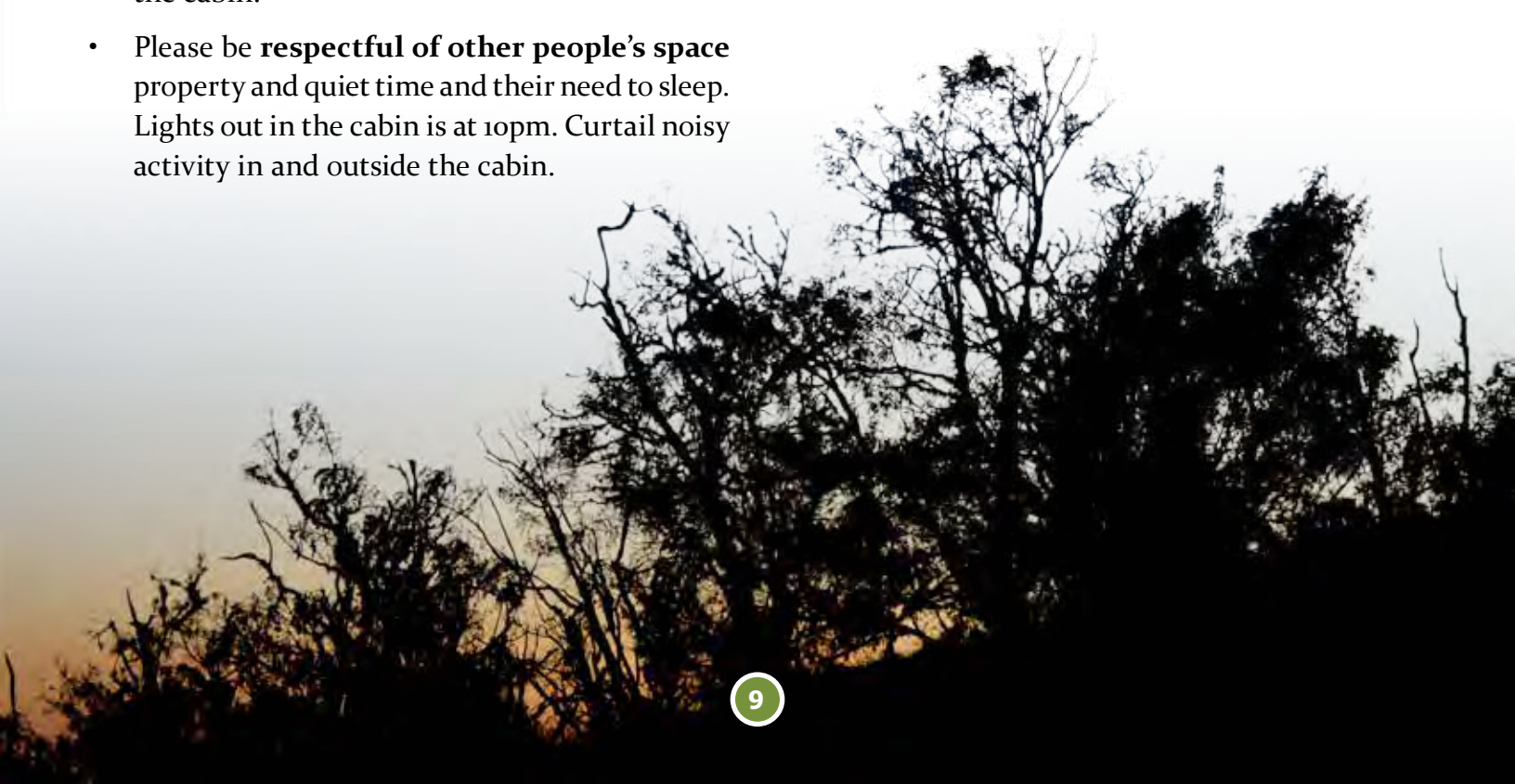
While limited, they did use the resources of the forest. On their journey, larger birds such as ‘ua‘u (*Pterodroma sandwichensis*) and nēnē (*Branta sandwicensis*) provided much needed food along with ‘ākala (*Rubus hawaiiensis*) and ‘ōhelo (*Vaccinium spp.*) berries. Some of the forest birds’ feathers were collected and brought to the chiefs to be made into royal cloaks. And the hard wood of the māmane was particularly sought after to be crafted into adze handles.

And because of its sanctity, many shrines, burials, and *kapu* surround the mountain top. Let us respect this important mountain and tread reverently in our work there.





## Camp Rules

- Prior to the trip, each volunteer (and chaperone) is required to carefully **review the MKFRP Volunteer Packet**. Each volunteer and/or chaperone is subject to the same State of Hawai'i laws and ethical codes as any MKFRP employee.
  - In signing the MKFRP waivers and Volunteer Agreement, **each volunteer accepts personal responsibility** for his/her own behavior and agrees to abide by the MKFRP rules and State law and behave accordingly.
  - A chaperone, group leader, or advisor is required with all youth groups. **The chaperone is fully responsible for the behavior and actions of the group.**
  - Inappropriate action by any volunteer may be grounds for **immediate removal** from MKFRP restoration areas.
  - When returning to the cabin after the workday, free time may be spent within an area prescribed by the MKFRP staff in and around the cabin.
  - Please be **respectful of other people's space** property and quiet time and their need to sleep. Lights out in the cabin is at 10pm. Curtail noisy activity in and outside the cabin.
  - **Respect natural resources**
  - Assist in preventing the introduction of plants or animals.
  - All natural resources are to be **left in their natural state**.
  - Protected species (i.e., Palila) should not be disturbed.
  - **Respect** cultural areas and practices
  - **Culturally responsible and respectful** conduct by all personnel is expected.
  - All archaeological, historical, cultural and religious sites and areas shall be **left in their natural state**.
  - **No gambling** activities are allowed.
  - Stay in safe and authorized work areas. **No wandering.**
  - **No fireworks are allowed.**
  - **No Smoking allowed.** Fire destroys our precious dry forests.
  - Narcotics, illegal drugs, and alcohol are **strictly prohibited**.
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## University of Hawaii at Manoa Pacific Cooperative Studies Unit

3190 Maile Way, St. John 410

Honolulu, Hawai'i 96822

Ph: (808) 956-3932; Fax: (808) 956-4710

Web: <http://www.botany.hawaii.edu/faculty/duffy/PCSU.htm>

### Single Activity Volunteer Application Form

Project Name: \_\_\_\_\_ Project Number: \_\_\_\_\_

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Phone (home): \_\_\_\_\_ (work): \_\_\_\_\_ (cell): \_\_\_\_\_

Best time to call: \_\_\_\_\_ E-mail: \_\_\_\_\_

#### In case of emergency, who should we notify?

Name: \_\_\_\_\_ Relationship: \_\_\_\_\_

Phone (home): \_\_\_\_\_ (work): \_\_\_\_\_ (cell): \_\_\_\_\_

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#### PLEASE READ CAREFULLY AND SIGN

I certify that the information provided on this Volunteer Application Form is true and accurate, and any misrepresentation provided on this form may result in my immediate termination as a volunteer. I have read the Volunteer Position Description. If selected, I will comply with all requirements specified by the project supervisor and acknowledge that the University may at its discretion terminate my participation in providing volunteer services at any time.

\_\_\_\_\_  
Signature of Applicant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name/Signature of Parent/Guardian (if under 18 years)

\_\_\_\_\_  
Date

*To be completed by Project Supervisor or Volunteer Coordinator and PCSU*

Project Service Group: \_\_\_\_\_ Date of Activity: \_\_\_\_\_

Volunteer Job Title: \_\_\_\_\_

Project Volunteer Supervisor: \_\_\_\_\_

PI or Authorized Rep: \_\_\_\_\_ Date: \_\_\_\_\_

Authorized by: \_\_\_\_\_ Date: \_\_\_\_\_

College of Natural Sciences



**University of Hawai'i at Manoa  
Pacific Cooperative Studies Unit**

3190 Maile Way, St. John 410  
Honolulu, Hawai'i 96822  
Ph: (808) 956-3932; Fax: (808) 956-4710

\_\_\_\_\_  
(Last name, First name, MI)

\_\_\_\_\_  
(PCSU Program)

**ASSUMPTION OF RISK AND RELEASE**

I, the undersigned, certify that I am in good physical health and able to participate in all activities of the above named program.

I also understand and acknowledge that there are inherent dangers and risks involved with participation in the above named program with PCSU and the University of Hawai'i, that include, but are not limited to: **gusty winds; sharp and/or slippery objects; stinging or biting insects and spiders; portable or no bathroom facilities; steep drop-offs and landslides; rugged terrain; steep and slippery trail and river crossings; no potable water; flash floods; sharp tools; lack of immediate medical facilities; wild animals; harsh weather conditions (hot and humid to wet and cold); thorny plants and dense vegetation; lack of reliable communication; no telephones; work on or near water; wet and slippery roads; herbicides; work in hunting areas; disease caused by water, air or animal vectors.**

I understand that I should be covered during the volunteer periods for this program by a private medical and liability policy; and I further understand that the University of Hawaii does not provide such insurance or otherwise indemnify individuals with respect to injuries or other liabilities arising out of participation in the above named program.

Therefore, in consideration of my being permitted to participate in the above named program, I hereby agree to assume all risks and responsibilities surrounding my participation in the above named program. I have read and understand any and all written materials setting forth the requirements for participation in the above referenced activities, and as well as those explained by the instructor(s), and I agree to strictly observe them. Further, I do for myself, my heirs, executors, and administrators hereby accept full responsibility for my participation and agree to indemnify, release, and discharge the University of Hawai'i, State of Hawai'i, its officers, employees, agents, and assigns from any and all claims or actions for property damage, personal injury, an/or death arising from such participation in the above named program or growing out of or caused by any acts or omissions during my participation in above named program.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time

\_\_\_\_\_  
Print and Sign Name of Parent/Guardian (if under 18 years)

\_\_\_\_\_  
Date

**MEDICAL CONSENT FORM**

I, the undersigned, consent to and authorize any medical professional and others working under their supervision to treat me for any injury or illness arising from or related to my participation in the above named program.

I further agree to pay any and all medical expenses, costs and other charges and to release and discharge and hold harmless the University of Hawai'i, State of Hawai'i, its officers, employees, agents, and assigns from and against any liability or any claims or demands arising from or connected with such medical treatment or care.

**IN CASE OF EMERGENCY:**

First Person to Contact: \_\_\_\_\_ Phone: \_\_\_\_\_

Second Person to Contact: \_\_\_\_\_ Phone: \_\_\_\_\_

Physician to Contact: \_\_\_\_\_ Phone: \_\_\_\_\_

Allergies: \_\_\_\_\_ Medical Condition: \_\_\_\_\_

Medications: \_\_\_\_\_

\_\_\_\_\_  
Print and Sign Name of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time

\_\_\_\_\_  
Print and Sign Name of Parent/Guardian (if under 18 years)

\_\_\_\_\_  
Date



## **Mauna Kea Forest Restoration Project: Volunteer Position Description**

**Project Name:** Mauna Kea Forest Restoration (MKFR)

**Project Contact/Ph/Email:** Robert Stephens/933-2756/robertms@hawaii.edu

**Locations of Assignment/Physical conditions:** Primarily at two sites on Mauna Kea: Pu'u Mali and Kaohe

**List Volunteer Duties:**

1. Collect seeds of native plants.
2. Control invasive plants by hand weeding and using weed whackers.
3. Plant seedlings.
4. Upkeep of the camp site.

**List Desired Skills/Abilities:**

1. Able to safely walk across rough, rocky terrain at 5,000 to 7,000 feet in elevation.
2. Interest in contributing to forest restoration.
3. Experience in out-planting seedlings.
4. Knowledge of Hawaiian flora and alien plants.

**Materials/Equipment To Be Utilized On The Project (provided by Program):** Dibble sticks, bags for collecting seed, weed whacker, and eye and ear protection are provided by the Program. For overnight volunteer trips at Puu Mali, there is a 16' x 20' cabin with a propane stove, cookware, dishes and utensils, water catchment, hot water heater and shower, and a small refrigerator. Fourteen A-frame sleeping structures and three composting toilets are present are also present.

**Materials/Equipment/Supplies (provided by volunteer):** Rain gear, hiking boots that come up above the ankle, sunscreen, 4wd transportation, and food and water are provided by the volunteer. For overnight trips, volunteers will provide their own sleeping bag, sleeping pad, warm clothes, head lamp, and food and water.

**Training/Orientation Needed:**

1. How to identify native plants and alien plants
2. The steps necessary to ensure high survival of outplanted seedlings.
3. Safe use of weed whackers

**Schedule:** Variable

**Supervised By:** MKFR Coordinator and/or MKFR Field Crew Leader

**Please sign and date:**

**I have read the volunteer project description and understand the scope of activities for this project which I am volunteering for:**

**Volunteer Name (print):** \_\_\_\_\_

**Volunteer Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

***If under 18 years:***

**Parent or Guardian Name (print):** \_\_\_\_\_

**Parent or Guardian Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_